

forming the first patterned thin film and an indicator having a shape similar to the first patterned thin film and located in a specific position with respect to the first patterned thin film; and

forming the second patterned thin film in a specific position by aligning with the position of the indicator.

REMARKS

Claims 6-12, 17-23 and 25 are pending. By this Amendment, claims 7 and 18 are amended to correct minor informalities, and claims 6, 17 and 25 are amended for reasons of patentability. Reconsideration of the application in view of the amendments and the following remarks is respectfully requested.

The attached Appendix includes marked-up copies of each rewritten paragraph (37 C.F.R. §1.121(b)(1)(iii)) and claim (37 C.F.R. §1.121(c)(1)(ii)).

Applicants appreciate the courtesies extended to Applicants' representative during the February 26 personal interview with Examiner Tugbang. The points discussed are incorporated into the following remarks.

I. OBJECTION TO THE ABSTRACT

The Office Action objects to the Abstract based on minor informalities. Applicants have enclosed a substitute Abstract to obviate the objection.

II. REJECTION UNDER 35 U.S.C. §112, SECOND PARAGRAPH

Claims 7 and 8 have been rejected under 35 U.S.C. §112, second paragraph as being indefinite. Applicants have amended claims 7 and 18 to obviate the rejection. Accordingly, withdrawal of the rejection under 35 U.S.C. §112, second paragraph is respectfully requested.

III. REJECTIONS UNDER 35 U.S.C. §102(b) AND 35 U.S.C. §103(a)

Claims 6, 7, 9-12, 17, 18, 20-23 and 25 stand rejected under 35 U.S.C. §102(b) as being anticipated by Chang (U.S. Patent No. 5,271,802); and claims 8 and 19 stand rejected

under 35 U.S.C. §103(a) over Chang in view of Simon (U.S. Patent No. 3,787,964).

Applicants respectfully traverse the rejection.

In particular, Change fails to disclose or suggest a method of manufacturing a magnetoresistive device substructure used for manufacturing a magnetoresistive device including at least forming a magnetoresistive element and an indicator having a shape similar to the magnetoresistive element, and located in a specific position with respect to the magnetoresistive element, and forming a soft magnetic layer in a specific position by aligning with the position of the indicator, as recited in independent claim 6, and similarly recited in independent claims 17 and 25.

Chang discloses a method of making a magnetic head slider having a protective coating on the rails, thereof, the protective coating containing a thin adhesion layer, a thin layer of amorphous hydrogenated carbon, and a thin masking layer. See, for example, Abstract of Chang.

Specifically, in Fig. 1 and col. 3, lines 16-23, Chang discloses that the slider supports a thin film magnetic read/write head, and the head is formed by depositing layers of magnetic material, electrically conductive material, and electrically insulating material to form the well known pole pieces and magnetic gap necessary for the transducing function with a magnetic coating on a magnetic recording medium.

However, Chang fails to disclose or suggest forming the soft magnetic layer in a specific position by aligning with the position of the indicator.

Simon fails to compensate for the above-noted deficiencies of Chang. Simon on col. 5, lines 6-10 discloses that thin-film magnetic heads are batch fabricated and a plurality of thin-film transformers are simultaneously deposited on each wafer shaped substrate.

Accordingly, Applicants submit that independent claims 6, 17 and 25 define patentable subject matter. Claims 7-12 and 18-23 depend from the independent claims, and

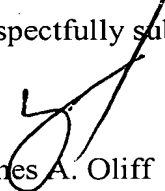
therefore define patentable subject matter. Accordingly, Applicants request that the rejections under 35 U.S.C. §102(b) and 35 U.S.C. §103(a) be withdrawn.

IV. CONCLUSION

In view of the foregoing amendments and remarks, Applicants submit that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 6-12, 17-23 and 25 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in better condition for allowance, the Examiner is invited to contact Applicants' undersigned attorney at the telephone number listed below.

Respectfully submitted,


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Attachments:
Appendix
Substitute Abstract

Date: March 24, 2003

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<p>DEPOSIT ACCOUNT USE AUTHORIZATION Please grant any extension necessary for entry; Charge any fee due to our Deposit Account No. 15-0461</p>
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ABSTRACT OF THE DISCLOSURE

A method is provided for manufacturing a magnetoresistive device substructure. The substructure includes: a TMR element; a bias field inducing layer that covers the TMR element; and a front flux probe layer formed on the bias field inducing layer and introducing a signal flux to the TMR element. In the manufacturing method, the TMR element and a dummy element are first formed. The dummy element has a shape similar to the TMR element and located in a specific position with respect to the TMR element. Next, the bias field inducing layer is formed on the TMR element in a specific position referring to the position of the dummy element. At the same time, a dummy bias field inducing layer is formed in a position located off the dummy element. Next, the front flux probe layer and a dummy front flux probe layer are formed at the same time on the bias field inducing layer and the dummy element, respectively.

APPENDIX

Changes to Abstract:

The following is a marked-up version of the amended Abstract.

ABSTRACT OF THE DISCLOSURE

A method is provided for manufacturing a magnetoresistive device substructure. The substructure includes: a TMR element; a bias field inducing layer that covers the TMR element; and a front flux probe layer formed on the bias field inducing layer and introducing a signal flux to the TMR element. In the manufacturing method, the TMR element and a dummy element are first formed. The dummy element has a shape similar to the TMR element and located in a specific position with respect to the TMR element. Next, the bias field inducing layer is formed on the TMR element in a specific position referring to the position of the dummy element. At the same time, a dummy bias field inducing layer is formed in a position located off the dummy element. Next, the front flux probe layer and a dummy front flux probe layer are formed at the same time on the bias field inducing layer and the dummy element, respectively.

~~———A magnetoresistive device substructure includes: a TMR element; a bias field inducing layer that covers the TMR element; and a front flux probe layer formed on the field inducing layer and introducing a signal flux to the TMR element. The substructure further includes: a dummy element; a dummy bias field inducing layer; and a dummy front flux probe layer. The dummy field inducing layer is located off the position of the dummy element. Alignment of the dummy field inducing layer and the dummy element allows alignment of the TMR element and the field inducing layer.~~

Changes to Claims:

The following is a marked-up version of the amended claims:

6. (Amended) A method of manufacturing a magnetoresistive device substructure used for manufacturing a magnetoresistive device incorporating: a magnetoresistive element; and a soft magnetic layer covering the magnetoresistive element and having at least one of functions of introducing a signal magnetic flux to the magnetoresistive element and inducing a bias magnetic field thereto, the method comprising the steps of:

forming the magnetoresistive element and an indicator having a shape similar to the magnetoresistive element and located in a specific position with respect to the magnetoresistive element; and

forming the soft magnetic layer in a specific position ~~referring to~~ by aligning with the position of the indicator.

7. (Amended) The method according to claim 6 wherein the indicator is a dummy element having a configuration similar to that of the magnetoresistive element and being incapable of functioning as a the magnetoresistive element.

17. (Amended) A method of manufacturing a magnetoresistive device incorporating: a magnetoresistive element; and a soft magnetic layer covering the magnetoresistive element and having at least one of functions of introducing a signal magnetic flux to the magnetoresistive element and inducing a bias magnetic field thereto, the method comprising the steps of:

forming the magnetoresistive element and an indicator having a shape similar to the magnetoresistive element and located in a specific position with respect to the magnetoresistive element; and

forming the soft magnetic layer in a specific position ~~referred to by~~ aligning with the position of the indicator.

18. (Amended) The method according to claim 17 wherein the indicator is a dummy element having a configuration similar to that of the magnetoresistive element and being incapable of functioning as a ~~the~~ magnetoresistive element.

25. (Amended) A method of manufacturing a micro device including a first patterned thin film and a second patterned thin film covering the first patterned thin film, the method comprising the steps of:

forming the first patterned thin film and an indicator having a shape similar to the first patterned thin film and located in a specific position with respect to the first patterned thin film; and

forming the second patterned thin film in a specific position ~~referring to by~~ aligning with the position of the indicator.